



*Removal Action Engineering
Design Report
Swan Island Upland Facility
Operable Unit 2
Portland, Oregon*

Prepared for:
Port of Portland

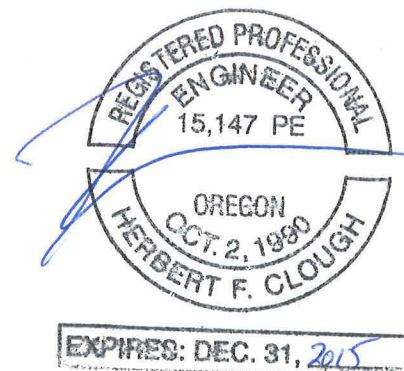
January 17, 2014
1115-16



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1.0 Introduction

This report presents the basis for design of the removal action for the Swan Island Upland Facility (SIUF; ECSI Site No. 271), Operable Unit 2 (OU2), Portland, Oregon (the "Site"). The removal action is being performed as part of a Voluntary Agreement for Remedial Investigation, Source Control Measures, and Feasibility Study for the SIUF between the Port of Portland (Port) and the Oregon Department of Environmental Quality (DEQ), dated July 24, 2006.

The purpose of this report is to present the removal action design basis to support the separate drawings and specifications. The report covers the engineering basis for each element of the design and discusses the confirmation sampling and analysis.

2.0 Background

2.1 Site Description

The Site is a portion of OU2 that is leased to Daimler Trucks North American LLC (DTNA). OU2 is a portion of the SIUF. Figure 1 shows the location of the SIUF. Figure 2 shows the boundary of OU2 and the Site. OU2 consists of approximately 24 acres of upland property at the SIUF and is owned by the Port.

The portion of OU2 leased to DTNA is used for temporary staging of trucks and trailers. Another portion of OU2 is leased to CEMEX for a concrete batch plant. The remainder of OU2 is vacant. The DTNA Leasehold covers approximately 7 acres at the southeast end of OU2. The CEMEX Leasehold includes approximately 12.1 acres in the central portion of OU2. Vacant areas include 2.7 acres of land along Berth 315 and the strip of land (2.4 acres) between the DTNA/CEMEX Leaseholds and the line of ordinary high water.

2.2 Remedial Investigation, Risk Assessment, Removal Action, and Feasibility Study

Since 2000, the Port has completed investigations/studies and a removal action at OU2. Remedial investigation data are summarized and evaluated in the human health risk assessment (Ash Creek, 2009). Additional sampling of surface soil at the site was completed in 2012 (Ash Creek, 2012).

The risk assessment concluded that baseline risk exceeded the acceptable risk level for construction and occupational workers as a result of direct contact with surface soil.

In 2005, a removal action was conducted at OU2 (Bridgewater Group, 2006). The removal action focused on soil with concentrations of arsenic that may constitute a hot spot based on the data at that time. A total of 297 tons of soil were excavated and disposed of in a licensed solid waste landfill.

A feasibility study (FS) was prepared (Ash Creek, 2013) to evaluate and recommend a cleanup remedy for OU2. The remedial action objectives (RAOs) for OU2 are to: (1) reduce arsenic concentrations in soil or prevent receptors from exposure to concentrations of arsenic in soil that exceed the greater of the default background concentration (DBC) or risk-based concentrations; and (2) remove or treat hot spots in soil to the extent practicable as defined by DEQ rules. Target concentrations are the DBC for arsenic of 8.8 milligrams per kilogram (mg/kg; DEQ, 2013) for occupational exposure, 13 mg/kg (DEQ, 2003; updated June 2012) for construction worker exposure, and 170 mg/kg for hot spots. The selected remedy was excavation of surface soil for off-site disposal.

In the interest of expediting the cleanup schedule, the selected remedial action is being implemented as a removal action prior to completion of the record of decision.

3.0 Soil Excavation

3.1 Performance Standards

Soil excavation will be implemented to address the RAOs summarized in Section 2.2. In addition, contingency planning is discussed for soil excavation in Section 3.9 below. Soil excavation will meet the following performance standard: surface soil not meeting the soil RAOs will be excavated and disposed of off-site.

3.2 Basis of Design

The design limits of excavation areas are defined by a combination of property boundaries and historical soil data. Final limits will be defined by the design limits, refined with proposed confirmation samples.

3.3 Excavation and Backfill Design

3.3.1 Target Excavation Zone

As determined in the FS (Ash Creek, 2013) and follow-up interaction with DEQ, the target excavation zone is defined as follows. With two exceptions, soil with arsenic above the DEQ DBC of 8.8 mg/kg will be excavated for off-site disposal in a licensed landfill. The area of excavation includes the hot spot areas. Figure 3 shows the minimum soil excavation area. The final lateral and vertical extent of the soil excavation will be defined as follows.

- Lateral Extent – Except for locations FS-2 and B-27, the minimum lateral extent of the excavation includes any sample with arsenic concentrations above the DBC. Location FS-2 is excluded because the shallowest sample (depth of 0.5 foot) concentration is less than the DBC and the concentration at 1.5 feet (11 mg/kg) only slightly exceeds the DBC. Location B-27 is excluded

because it is surrounded on all sides by samples with concentrations below the DBC. The final lateral extent of the excavation will be determined from confirmation sampling as described in Section 3.8.

- **Vertical Extent** – The FS-series sampling (Ash Creek, 2012) represents the most comprehensive systematic sampling of the DTNA leasehold area completed to date. At each location, samples were collected at three depth intervals: 0.25 to 0.75 foot, 1.25 to 1.75 feet, and 2.25 to 2.75 feet. At each depth, the samples were collected over an interval of approximately 6 inches. Except for location FS-2, every sample collected from the lower two intervals was below the DBC. In addition, there is no correlation between the detected concentration in the first interval and the detected concentration in the second interval. These facts indicate that the second interval samples are not impacted, so the depth of excavation would be greater than 0.25 foot but less than 1.25 feet. Therefore, the minimum excavation depth is 0.5 foot. Final excavation depths will be determined from confirmation sampling as described in Section 3.8.

3.3.2 Soil Excavation

Soil will be excavated to the extent described in Section 3.3.1. Soil samples will be collected to confirm that soil with arsenic detected above the DBC is removed. Confirmation sampling is described in Section 3.8. Soil will be stored, handled, and removed according to the following.

- **Soil Excavation.** Excavated soil will be maintained within the limits of the excavation, processed in accordance with this report, stockpiled in accordance with this report, or placed immediately into a waiting truck.
- **Processing to Separate Gravel from Sand.** A bench-scale test was completed to confirm that nearly 50 percent of the material is coarser than the No. 4 sieve and processing the soil by separating gravel from the sand/silt is feasible (Apex, 2014). The soil processing area will be designated by the contractor within the limits of the work and shall be of sufficient size to accommodate all activities associated with processing the soil including stockpiling (before and after processing), sieving, and loading. The processing area will be delineated with temporary fencing to limit travel in and out of the processing area to authorized vehicles. The processing area will not be lined. At the completion of soil processing, the processing area will be excavated for off-site disposal as directed by Apex Companies, LLC (Apex). Confirmation sampling will be completed in the processing area as discussed in Section 3.8. Additional removal will be completed as necessary to achieve acceptable confirmation sample results. Material excavated from the processing area will not be processed prior to loading and off-site disposal.
- **Stockpiling.** Stockpiling may be used at the discretion of the contractor. Method A is for stockpiles of soil with arsenic above the DBC that are being used on a daily basis. Method B is for soil awaiting use as backfill. Method C is for any other stockpiles.

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- **Method A** – Method A stockpiles are allowed only within the area of excavation where confirmation sampling has not been conducted or in the soil processing area. Method A stockpiles do not require a liner or cover. However, the contractor will choose from a variety of erosion and dust control best management practices to maintain stockpiles in accordance with these requirements. Stockpiles will be maintained in a manner that prevents dust generation, run-on, runoff, or erosion of the stockpiles. Stockpiles of soil awaiting processing will be maintained in a manner that protects the soil from rainfall. Confirmation sampling will be completed after removal of Method A stockpiles using methods described in Section 3.8.
 - **Method B** – Method B stockpiles are allowed within the work limits, outside of potential excavation areas. Method B stockpiles do not require a liner or cover. However, the contractor will choose from a variety of erosion and dust control best management practices to maintain stockpiles in accordance with these requirements. Stockpiles will be maintained in a manner that prevents dust generation, run-on, runoff, or erosion of the stockpiles.
 - **Method C** – Under Method C, soil will be placed in a covered and labeled roll-off box or in a lined and covered stockpile. Stockpiles will be maintained in a manner that prevents run-on, runoff, and erosion of the stockpiles. Stockpiles will be placed on plastic sheeting with a berm around the perimeter of the stockpile. The berm may be constructed by laying the bottom plastic over straw bales, Jersey Barriers, ecology blocks, or by other equivalent methods. When not active, stockpiles will be covered with plastic and secured with sand bags or equivalent.
 - **Loading and Hauling.** During loading, care will be taken to minimize spillage of soil on the exterior of the trucks or clean ground surface. Any soil on the truck exterior will be removed prior to leaving the loading area. The trucks will be covered with a tarp prior to departing the Site. Trucks will not be allowed to leave the Site if liquids are draining from the load. Excavated soil will be transported in accordance with appropriate Department of Transportation (DOT) regulations for solid or hazardous waste, as applicable.
 - **Waste Designation.** As part of the sieve test work, composite samples were collected from the upper (0 to 6 inches) and lower (6 to 12 inches) portions of the target excavation area for both the unsieved and sieved samples. These composite samples were analyzed for toxicity characteristic leaching procedure (TCLP) arsenic. TCLP arsenic was not detected in these samples at a detection limit of 0.05 mg/L, less than the characteristic hazardous waste limit of 5 mg/L. Therefore, the excavated soil is not a hazardous waste.
 - **Estimated Quantities.** The total quantity of soil to be excavated for off-site disposal is estimated to range from 1,100 to 5,200 cubic yards (1,900 to 8,800 tons). Approximately 800 to 4,200 tons of the total consists of gravel that will be separated by sieving for re-use on-site as fill.

3.3.3 Soil Disposal

After separation of gravel from sand in the excavated soil, the soil will be disposed of as follows. The gravel fraction of the soil will be returned to the excavation (estimated at 470 to 2,000 cubic yards). The sand and finer fraction will be disposed of in a solid waste landfill meeting Subtitle D design standards (estimated at 1,100 to 5,300 tons).

3.3.4 Backfill

In general, the excavation will be backfilled with imported granular fill, compacted to support highway truck traffic. The gravel portion of the excavated soil separated from the finer fraction will be used in the lower portion of the fill. Imported crushed rock will be used for the surface material.

3.3.5 Construction Considerations

The Site is used by a Port tenant (DTNA) to store trucks and truck trailers. Construction activities will be coordinated with the tenant.

The work may be completed at the same time as source control construction on the adjacent riverbank. Construction activities will be coordinated between the two projects.

3.4 Quality Assurance/Quality Control

Construction quality assurance/quality control (QA/QC) will consist of the following elements.

- Removal of Soil – It will be verified that the following elements are consistent with design drawings/specifications: extent of excavation, on-site storage, and hauling of soil.
 - Excavation extent will be verified by confirmation sample and collection (see Section 3.3.1 and 3.8).
 - Excavation extent will be documented with GPS coordinates and photographs.
 - Conformance of stockpiles to specifications will be documented with photographs and in the field notes.
 - Photographs will be taken to document that trucks are properly covered and cleaned prior to leaving the Site.
- Backfill – It will be verified that the following elements are consistent with design drawings/specifications: fill material, compaction, finish grade of surface.
 - Testing reports will be obtained from the material supplier confirming fill meets the requirements of the specifications. This will be confirmed with visual inspection of particle size.

-
- Compaction will be verified with field density tests.
 - Surface grades will be surveyed before and after construction to verify that the final finish surface matches the prior existing grades.
 - Soil Processing – It will be verified that the following elements are consistent with design drawings/specifications: separation of gravel from fines.
 - Laboratory sieve tests will be used to verify that less than 2 percent by weight of material passing the No. 10 sieve is present in the gravel fraction.

3.5 Health and Safety

Soil excavation includes potentially hazardous activities that will be addressed by a health and safety plan. The activities addressed by the plan include:

- Physical hazards associated with excavation, loading, and hauling; and
- Direct contact with soil or inhalation of dust during excavation and sampling.

Apex will prepare a health and safety plan that governs Apex's oversight and sampling activities during construction. The contractor for excavation will be required to prepare a health and safety plan governing their on-Site activities.

3.6 Environmental Protection

3.6.1 Waste Streams

The work will generate waste streams. The following lists each waste stream together with a summary of how that waste stream will be handled.

- Soil with Arsenic – Excavation will generate soil containing arsenic. The soil will be disposed of in accordance with Section 3.3.3.
- Decontamination Water – Decontamination water will be generated during decontamination of construction equipment or sampling devices. The water will be collected in DOT-approved drums or equivalent and sampled for waste designation. Based on the waste designation, the water will be recycled or disposed of in an appropriate facility. Alternatively, small quantities of decontamination water may be added to soil being disposed of in the landfill.

3.6.2 Emissions, Dust, and Spills

Excavation will require disturbance of soil using petroleum-fueled, hydraulically controlled equipment. The following best management practices will be implemented to reduce emissions, reduce potential environmental impacts, and control dust.

- Equipment will be well-maintained.
- Where applicable, equipment will be required to use ultra-low-sulfur diesel.
- Equipment will not be allowed to idle when not in use.
- Refueling will not occur within 50 feet of a stormwater inlet.
- Contractors will be required to maintain a spill kit for immediate response in the event of a release of fuel or hydraulic fluid.
- Dust control will include wetting haul roads and covering or lightly wetting stockpiles, as needed.

3.6.3 Erosion and Sedimentation

Excavation has the potential to cause erosion or sedimentation problems. The areas that will be exposed to precipitation will be protected from erosion and sediment transport by placing filter fabric on inlets and surrounding inlets with bio-bags. Any soil stored on-Site will be maintained as described in Section 3.3.2. A gravel pad will be constructed at the Site exit to reduce tracking of sediment onto paved streets.

3.7 Operations and Maintenance

There are no operations or maintenance associated with excavation and backfill.

3.8 Confirmation Sampling

Sample Locations. Soil confirmation samples will be collected at the locations described below.

- **Excavation Lateral** – The final lateral extent of the excavation will be determined based on confirmation sampling on the excavation perimeter. Figure 3 shows the proposed confirmation sampling scheme. Sample stations will be established around the excavation perimeter at a spacing of not greater than 100 lineal feet (e.g., if the length of the excavation perimeter is 550 feet, a minimum of 6 confirmation sample stations would be established). Confirmation sample stations will not be established on excavation walls that extend to the fenced Site boundaries. At each sample station, one or more confirmation samples will be collected (on a transect perpendicular to the excavation perimeter) to define the location where the concentration is below the DBC. At each station, the first sample will be collected from the sidewall of the minimum excavation extent. Subsequent samples will be collected 10 to 25 feet from the prior

sample. Excavation will continue until confirmation sample concentrations are at or below the DBC.

- Excavation Vertical – The final vertical extent of the excavation will be determined based on confirmation sampling of the base of the excavation. At a minimum, one sample will be collected for each 5,000 square feet of excavation area. Excavation will continue until confirmation sample concentrations are at or below the DBC.
- Soil Processing Area – Final cleanup of the soil processing area will be determined based on confirmation sampling of the processing area. At a minimum, one sample will be collected for each 5,000 square feet of processing area. If needed, soil will be excavated (for off-site disposal without processing) until confirmation sample concentrations are at or below the DBC.

Sampling Procedure. Confirmation samples will be 4-point composites collected at the corners of a nominal 5-foot square. For excavation perimeter samples, one side of the composite sample square will lay on the edge of the excavation, and the samples will be collected over a 6-inch depth interval beginning at the ground surface. For excavation base and soil processing area samples, the composite square will be centered on the sample location, and the samples will be collected over a 6-inch depth interval beginning at the base of the excavation or ground surface. Equal aliquots will be obtained from each sub-sample location, placed into a stainless steel bowl, thoroughly mixed to a uniform texture and color, and the sample will be collected from the bowl.

3.9 Contingency Actions

The contaminated soil will be removed to the extent specified in Section 3.3.1. At that time, confirmation sampling will be conducted as summarized in Section 3.8. In the event that confirmation sampling indicates that cleanup levels have not been achieved, additional soil will be excavated and confirmation sampling will be repeated.

3.10 Closeout

Closeout will consist of preparation of a report documenting completion of the removal action in accordance with the design documents.

3.11 Permitting

A grading permit will be obtained from the City of Portland.

3.12 Project Management, Schedule, and Reporting

Project Team Members. The following is an outline of the key roles involved with the project.

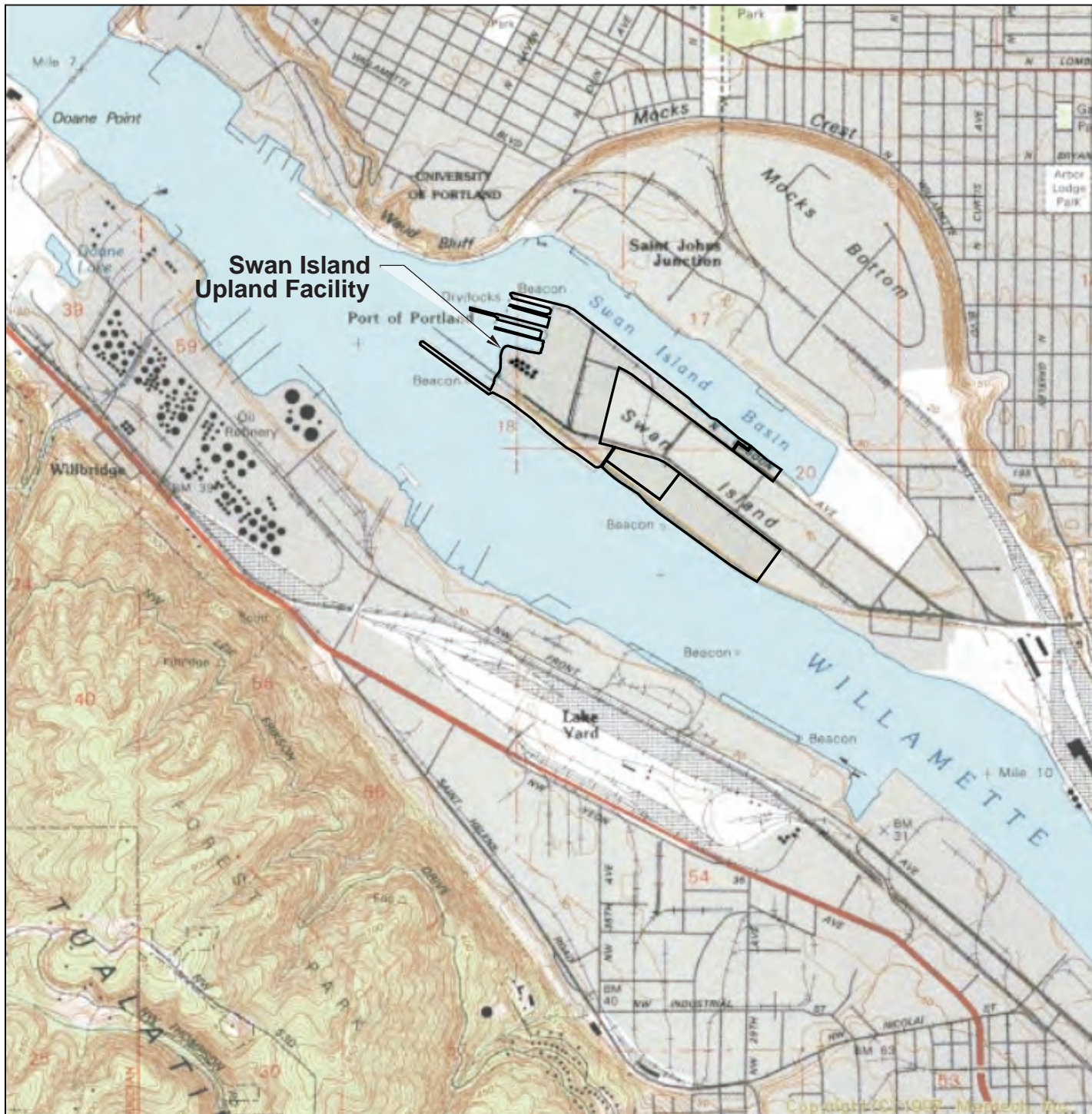
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- Project Owner – The Port is the property owner and the party for which the work is being completed.
 - Property Tenant – DTNA is a tenant on the property, storing trucks and truck trailers.
 - Project Consultant – Apex is the engineering consultant responsible for preparing the design, implementing the removal action, conducting confirmation sampling, and preparing project documentation.
 - DEQ – DEQ is the oversight agency.
 - Subcontractor – The removal action will be implemented by a subcontractor to Apex, to be selected through a competitive procurement process.

Schedule. The overall goal is to complete the construction work prior to June 30, 2014. A detailed schedule will be prepared after selection of the construction subcontractor.

Reporting. Reporting will include progress reports during construction and the construction documentation report. In addition to the ongoing quarterly progress reports to DEQ, during construction, progress reports will be submitted via email. Progress reports will be submitted as needed, generally on a weekly basis. Progress reporting will be used to submit initial results of confirmation sampling to obtain approval for the limits of the excavation. The construction documentation report will describe the construction activities and present the results of quality assurance observations and confirmation sampling.

4.0 References

- Apex Companies, 2014. *Bench-Scale Sieve Test Results – OU2 Swan Island Upland Facility, Portland, Oregon, ECSI No. 271*. January 9, 2014.
- Ash Creek, 2009. *Baseline Human Health Risk Assessment, Operable Unit 2, Swan Island Upland Facility, Portland, Oregon*, prepared for the Port of Portland. September 1, 2009.
- Ash Creek, 2012. *Surface Soil Sampling Results — Operable Unit 2, Daimler Leasehold, Swan Island Upland Facility, Portland, Oregon, ECSI No. 271*. November 28, 2012.
- Ash Creek, 2013. *Feasibility Study, Operable Unit 2, Swan Island Upland Facility, Portland, Oregon*, prepare for the Port of Portland. January 2013.
- Bridgewater Group, 2006. *Operable Unit 2, Removal Action Report, Swan Island Upland Facility*. April 2006.
- DEQ, 2003. *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*. Oregon Department of Environmental Quality, Land Quality Division, Environmental Cleanup and Tanks Program. September 22, 2003 (Updated June 7, 2012).
- DEQ, 2013. *Background Levels of Metals in Soils for Cleanups*. Fact Sheet, Oregon Department of Environmental Quality, Land Quality Division, Environmental Cleanup Program. March 20, 2013.



NOTE: Base map prepared from USGS 7.5-minute quadrangles as provided by Topozone. (1990)

0 2,000 4,000
Approximate Scale in Feet



Facility Location Map

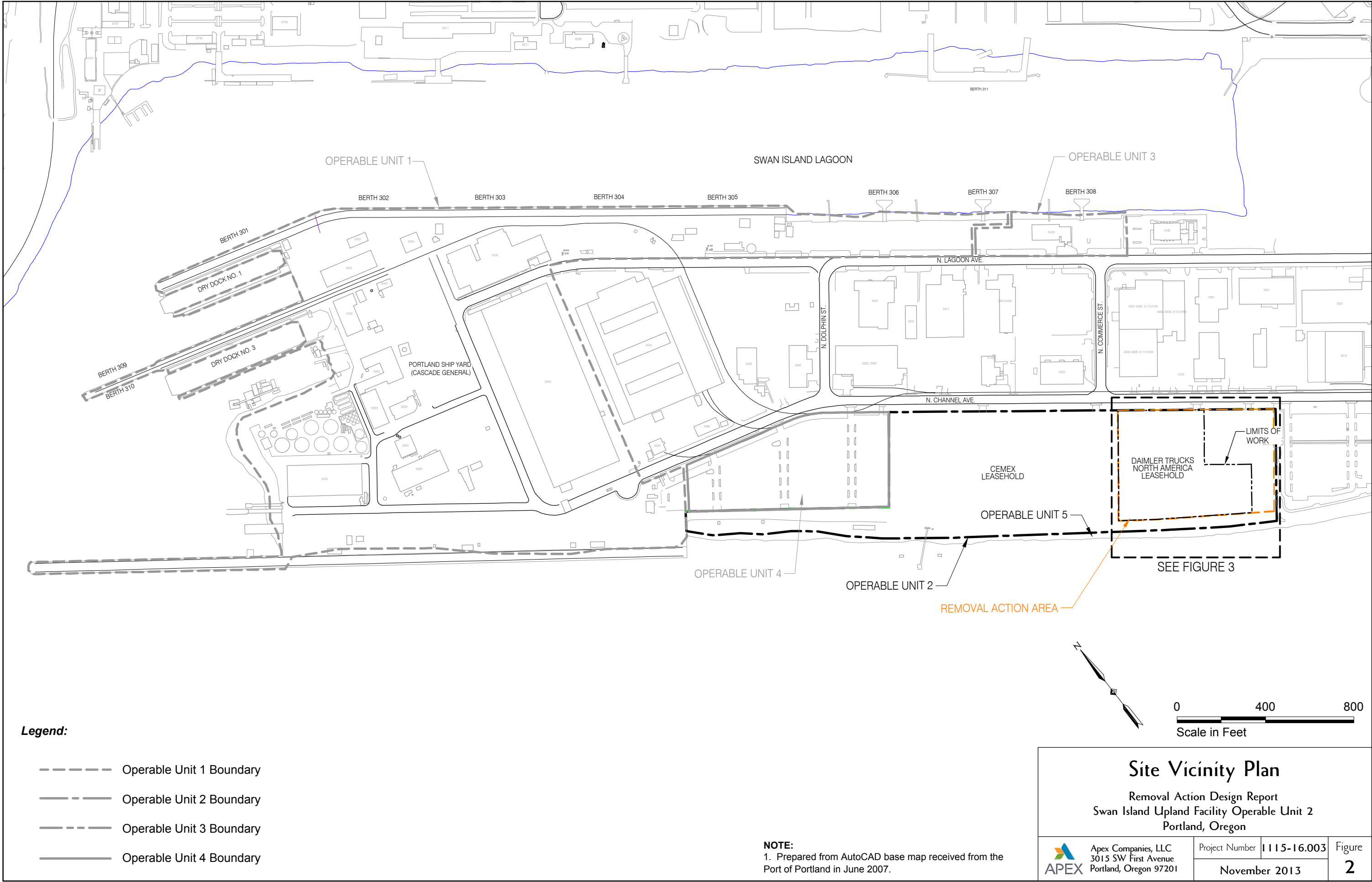
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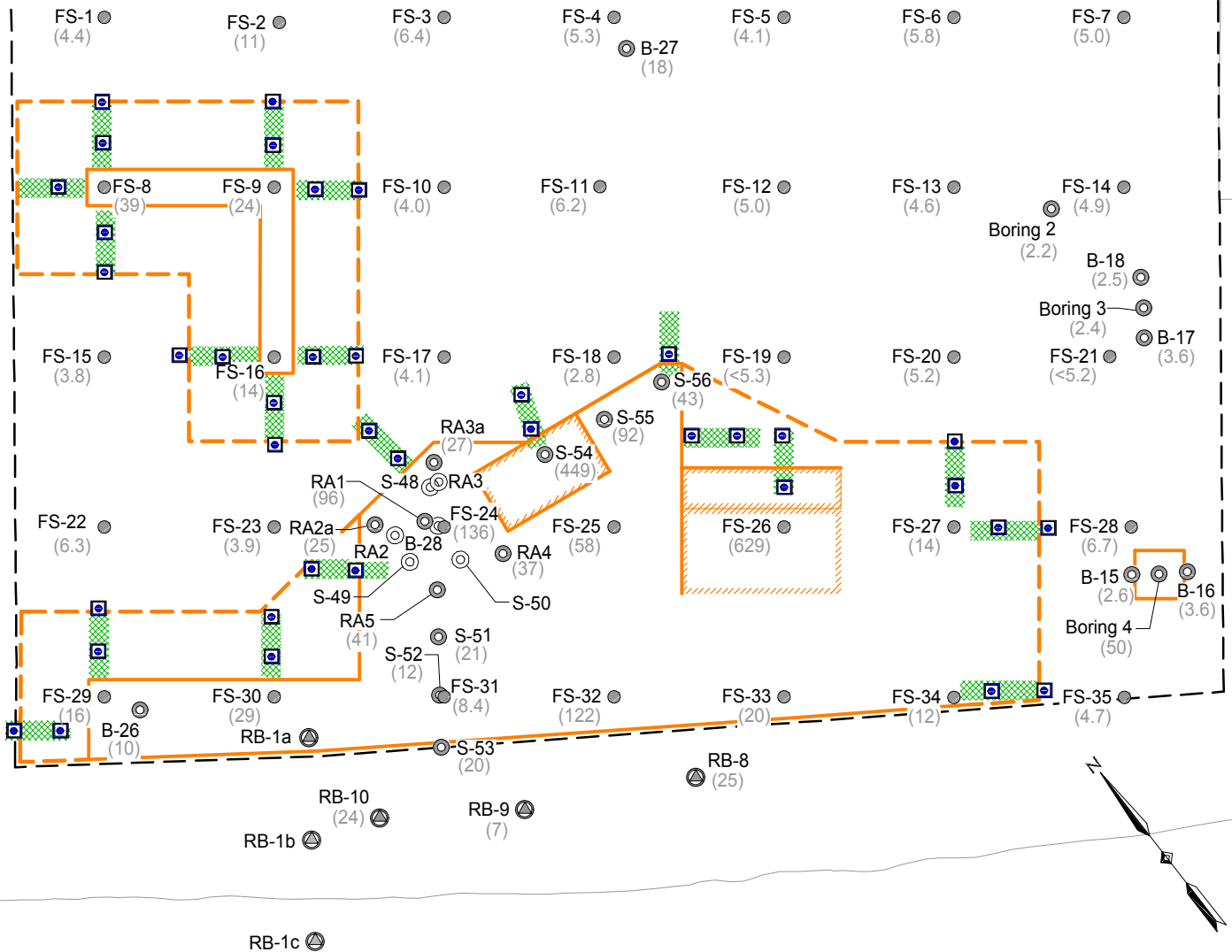


Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number **1115-16.003**
November 2013

Figure
1





Legend:

(10) Arsenic Concentration in mg/kg

Minimum } Estimated Range of Excavation
Maximum } (Estimated Depth = 0.5 to 1.5 feet)

Estimated Extent Exceeding Hot Spot Level (170 mg/kg)

FS-1 ● 2012 Exploration Location

B-26 ● Soil Sampling Location

RB-1a ● Riverbank Soil Sampling Location

B-28 ● Soil Sampling Location
(Soil Removed During 2006 Removal)

— Daimler Trucks North America Lease Area
(Approximate)

Approximate Confirmation Sample Station Location

Approximate Confirmation Sample Location

0 100 200
Scale in Feet

NOTES:

- Where multiple samples collected at a location, concentration shown is maximum in the depth interval of 0-3 feet.
- Arsenic concentrations greater than the Remediation Level detected only in the 0-1 foot interval.

Excavation and Disposal Alternative

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Portland, Oregon



Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1115-16.003

November 2013

Figure

3